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The attached documents are exact copies of the European patent application described on the following page, as originally filed.

Les documents fixés à cette attestation sont conformes à la version initialement déposée de la demande de brevet européen spécifiée à la page suivante.

Patentanmeldung Nr. Patent application No. Demande de brevet n°

04003529.7

Der Präsident des Europäischen Patentamts;
Im Auftrag

For the President of the European Patent Office

Le Président de l'Office européen des brevets
p.o.

R C van Dijk

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Bezeichnung der Erfindung/Title of the invention/Titre de l'invention:
(Falls die Bezeichnung der Erfindung nicht angegeben ist, siehe Beschreibung.
If no title is shown please refer to the description.
Si aucun titre n'est indiqué se referer à la description.)

Alcohol metabolism moderating composition

In Anspruch genommene Priorität(en) / Priority(ies) claimed /Priorité(s) revendiquée(s)
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A23L1/00

Am Anmeldetag benannte Vertragstaaten/Contracting states designated at date of filing/Etats contractants désignées lors du dépôt:

AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LU MC NL
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ALCOHOL METABOLISM MODERATING COMPOSITION

The present invention is directed to a composition, in particular a food composition which is active in respect to the support and/or the moderation of an alcohol degradation process within the human body.

The present invention particularly addresses the problem of rapid alcohol degradation i.e. alcohol metabolism as may occur in most people of Non-Caucasian type genetic structure.

In this regard, an object of the present invention is to achieve solutions which provide a reduction in the physiological stress in connection with the consumption of alcohol, in particular for people with a predisposition towards rapid alcohol degradation.

According to the present invention this object is attained by a food composition including the following substances:

dextrose, Vitamin C, L-glutamine
cysteine, riboflavin, succinic acid, fumaric acid, and
coenzyme Q10,

all substances in physiologically relevant doses.

With this particular food composition, it will become possible to suppress the production of a particular dehydrogenase enzyme (ADH_3) and to slow the ethanol

metabolism process. Further the enzymatic activity of aldehyde dehydrogenase $ALDH_2$ will be enhanced, so that the metabolisation of acetaldehyde will be supported.

These particular effects help to reduce a flushing syndrome, reduce the likelihood of headaches and also help to avoid or ease a hangover the day after.

The particular food composition is considered to be appropriate to reduce a peak of excess acetaldehyde entering the blood stream and is intended to lower the risk of damage to vital organs and functions of the human body, and in this connection also lower the risk of several forms of cancer.

Preferably this food composition should be taken about 5 minutes prior to consumption of alcohol and in case of high alcohol consumption again whilst consuming alcohol. The mass of the food composition taken by the consumer should be in the range of about 70 to 120% of the mass of the alcohol included in the consumed drinks. A standard dose might include about 10.0g dextrose, 1.0g Vitamin C, 1.5g L-glutamine, 500mg cysteine, 40mg riboflavin, 100 mg succinic acid, 100 mg fumaric acid and 60mg coenzyme Q10.

The particular food composition is intended to prevent too much acetaldehyde passing into the mitochondrial matrix and to suppress self-blockade of the enzymatic activity of ALDH and thus facilitate its own decomposition.

The risk of alcohol consumption may therefore be significantly reduced by the use of the food composition according to the present invention, as this food composition helps to immediately bring down the level of acetaldehyde after drinking and simultaneously provides a protective effect in respect of the suppression of the generation of free radicals.

Said food composition is preferably in such a form, preferably as ingredients of a kind of aperitif, that it allows the food composition to be consumed within a restaurant or a bar prior to consuming alcoholic drinks. Preferably a dosage for a

person with a body weight of about 80 kg includes a dextrose fraction of approx. 75%, wherein the said dosage may have an overall weight of about 10 to 15, preferably 13.3g. Such a dosage is to provide a considerable moderation in degrading about 18ml alcohol.

The food composition is preferably constituted in a manner wherein a dosage of same, includes a dextrose fraction of about 75.2 mass%, i.e. a quantity of dextrose in the range from 7.2 to 12.8g, preferably 10.0 g within a dose of 13,3g.

The food composition is preferably constituted in a manner wherein a dosage of same includes a Vitamin C fraction of about 7.5 mass% i.e a quantity of Vitamin C in the range from 0.78 to 1.18 g, preferably 1.0g, within a dose of 13.3g.

The food composition is preferably constituted in a manner wherein a dosage of same includes a L-glutamine fraction of about 11.27 mass%, i.e. a quantity of said L-glutamine fraction in the range from 1.23 to 1.7 g, preferably 1.5g, within a dose of 13.3g.

The food composition is preferably constituted in a manner wherein a dosage of same includes a cysteine fraction of about 3.76 mass%, i.e. a quantity of said cysteine fraction in the range from 460 to 540 mg, preferably 500mg, within a dose of 13.3g.

The food composition is preferably constituted in a manner wherein a dosage of same includes a riboflavin fraction of about 0.30 mass% i.e. a quantity of said riboflavin in the range from 32 to 48 mg, preferably 40mg, within a dose of 13.3g.

The food composition is preferably constituted in a manner wherein a dosage of same includes a succinic acid (Bernsteinsäure) fraction of about 0.752 mass%, i.e. a quantity of said succinic acid in the range from 90 to 110 mg, preferably 100mg, within a dose of 133g.

The food composition is preferably constituted in a manner wherein a dosage of same includes a fumaric acid (Fumarsäure) fraction of about 0.752 mass%, i.e. a quantity of said fumaric acid in the range from 90 to 110 mg, preferably 100mg, within a dose of 13.3g.

The food composition is preferably constituted in a manner wherein a dosage of same includes a coenzyme fraction of about 0,451 mass%, i.e. a quantity of said coenzyme fraction in the range from 50 to 70 mg, preferably 60mg, within a dose of 13.3g.

The food composition is preferably constituted in a manner wherein a dosage of same is in the form of tablets. Preferably, each tablet is so shaped and dimensioned that it allows said tablet to be easily swallowed.

Preferably, said tablets are in such a form that one dosage includes a plurality of those tablets.

The tablets may be accommodated within a dosage receptacle which includes a number of those tablets. It is possible for the food composition to be in the form of small tablets or balls, and to keep same in a small tube, while the volume of the food composition taken by the consumer can be determined with respect to the volume of alcohol which is expected to be consumed.

The food composition may also be in a form similar to sugar-cubes, or might be in the form of cryopowder.

The food composition may be separated into separate subunits. It is possible to provide one unit, for example a capsule including the Vitamin C fraction, cysteine, riboflavin, succinic acid, fumaric acid and coenzyme Q10, whilst most of the dextrose fraction is kept in separate units, capsules, tablets or the like.

It is possible to add further substances such as fruit juice extracts, curcuma, tannin, a powder of Panax notoginseng, and Vinca rosea in suitable amounts. Oolong tea, aloe vera and spiral water algae might also be added.

The food-composition may also be in the form of a liquid, in particular a sirup-type liquid. It is possible to provide the food composition in the appearance of a soft drink in a small bottle.

The particular food composition is considered to provide the following achievements:

1. Reduction of ethanol metabolism by slowing down the process of ethanol oxidation into acetaldehyde, to prevent accumulation of acetaldehyde in the first place.
2. Stimulation of the activity of ALDH and avoiding any blockade of its enzymatic activity.
3. Speeding up the reaction from acetaldehyde to acetic acid and the further decomposition in the citrate cycle.
4. Improving the levels of those anti-oxidants of the alcohol consumer, which specially protect against toxic effects of acetaldehyde.

<u>The first achievement</u>

is believed to be reached by the intake of a large dose of dextrose sugar (glucose). Glucose is rapidly oxidised in the cytosol of liver cells using the same cytosol NAD+ pool used by ethanol to be converted into acetaldehyde. Because the amount of cytosolic NAD+ is limited and can only constantly be reproduced from NADH+H much less acetaldehyde accumulates.

The second achievement

is also believed to be achieved by the intake of a large dose of glucose. Glucose augments the enzymatic activity of ADH as well as of ALDH. When a large glucose load occurs in the cytosol of liver cells then there is no possibility that the acetaldehyde reaches levels which could lead to inactivation of ALDH or to mitochondrial destruction.

The third achievement

is believed to be performed by

a) Accelerating the reoxidation from NADH+H+ to NAD+ by speeding up the transport of electrons through the inner mitochondrial membrane

b) Accelerating the Krebs cycle

It is believed to be achieved by the inclusion of coenzyme Q_{10} and riboflavin. Riboflavin will quickly be transformed to FMN, which together with coenzyme Q_{10} is the determining substance for the speed of the reoxidation of $NADH+H^+$ to NAD^+ in the mitochondrial matrix. Acetaldehyde needs NAD+ when it is metabolised to acetic acid. Within this reaction NAD^+ is transformed into $NADH+H^+$. Because the availability of NAD^+ is limited in the mitochondrial matrix $NADH+H^+$ has to be re-transformed into NAD^+ to serve again for acetaldehyde decomposition. This reaction is only possible because FMN and coenzyme Q_{10} absorb the electrons of $NADH+H^+$ and shuttle them through the mitochondrial membrane. The more FMN and coenzyme Q_{10} are available, the more this process is speeded up and, because more NAD^+ is available, the metabolism of acetaldehyde is accelerated.

The inclusion of coenzyme Q_{10} also makes also sense because its level decreases in the human body with progressing age.

The activation of the Krebs (citrate) cycle is believed to be achieved by the inclusion of succinic acid and fumaric acid. Both substances activate the second half of the citrate cycle and thereby activate the aerobic oxidation process in mitochondria. L-glutamine helps to speed up the mitochondria-cytosolic malate-asparate shuttle, which plays a key role in the course of intoxication by acetaldehyde. It also speeds up the succinate oxidation process by preventing oxalic and acetic inhibition of succinate dehydrogenase.

The fourth achievement,

the elevation of anti-oxidant levels, is believed to be achieved by the inclusion of cysteine, ascorbic acid and also of L-glutamine. Cysteine should provide a strong anti-oxidant effect as well as ascorbic acid. The human body transforms cysteine to gluthatione which specially protects against the toxic effects of acetaldehyde. To reach an optimal level of gluthatione and to avoid cysteine being transformed to cystine, it is important to combine cysteine with glutamine and give twice as much ascorbic acid as cysteine.

By taking the mentioned substances, it is expected that the level of acetaldehyde after drinking alcohol will be remarkably reduced and flushing symptoms at least diminished. The other known side-effects of acetaldehyde such as headaches and hangovers should also disappear.

CLAIMS

1. Food composition for effecting an alcohol degradation process in respect to ethanol metabolism within the human body, including the following substances in physiologically relevant amount:

dextrose,
Vitamin C,
L-glutamine,
cysteine,
riboflavin,
succinic acid, and/or fumaric acid,
coenzyme Q10.

2. Food composition according to claim 1, wherein a dose of same has a weight of about 13.3g, said dose being configured in a manner which allows same to be consumed within a restaurant or a bar prior to the consumption of alcohol.

3. Food composition according to claim 1 or 2, wherein a dose of same includes a dextrose fraction of about 75.2 mass%.

4. Food composition according to at least one of claims 1 to 3, wherein a dose of same includes a Vitamin C fraction of about 7.5 mass%.

5. Food composition according to at least one of claims 1 to 4, wherein a dose of same includes a L-glutamine fraction of about 11.28 mass%.

6. Food composition according to at least one of claims 1 to 5, wherein a dose of same includes a cysteine fraction of about 3.76 mass%.

7. Food composition according to at least one of claims 1 to 6, wherein a dose of same includes a riboflavin fraction of about 0.3 mass%.

8. Food composition according to at least one of claims 1 to 7, wherein a dose of same includes a succinic acid fraction of about 0.752 mass%.

9. Food composition according to at least one of claims 1 to 8, wherein a dose of same includes a fumaric acid fraction of about 0.752 mass%.

10. Food composition according to at least one of claims 1 to 9, wherein a dose of same includes a coenzyme fraction of about 0.451 mass%.

11. Food composition according to at least one of claims 1 to 10, wherein same is in the form of tablets.

12. Food composition according to at least one of claims 1 to 10, wherein a dose of same includes a plurality of small tablets or capsules.

13. Food composition according to at least one of claims 1 to 10, wherein said tablets or capsules are contained in a dosage receptacle.

14. Food composition according to at least one of claims 1 to 10, wherein said composition is of a sugar-cube type form.

15. Food composition according to at least one of claims 1 to 10, wherein same is in the form of cryopowder.

16. Food composition according to at least one of claims 1 to 10, wherein same is in the form of a small drink unit.

17. Food composition according to at least one of claims 1 to 10, wherein same is in the form of a sirup.

18. Food composition for affecting alcohol degrading process in respect to ethanol metabolism within the human body, including substances, in particular substances mentioned above, providing the following effects within the human body:

- Reducing ethanol metabolism by slowing down the process of ethanol oxidation into acetaldehyde, to prevent accumulation of acetaldehyde in the first place;
- Stimulating the activity of ALDH and avoiding any blockade of its enzymatic activity;
- Speeding up the reaction from acetaldehyde to acetic acid and further decomposition in the citrate cycle;
- Improving the levels of those anti-oxidants of the alcohol consumer which specially protect against toxic effects of acetaldehyde.

Abstract

The present invention is directed to a composition, in particular a food composition, which is active in respect to the support and/or the moderation of an alcohol degradation process within the human body. The present invention particularly addresses the problem of rapid alcohol degradation i.e. alcohol metabolism as may occur in most people of Non-Caucasian type genetic structure. In this regard, an object of the present invention is to achieve solutions which provide a reduction in the physiological stress in connection with the consumption of alcoho,l in particular for people with a predisposition towards rapid alcohol degradation. According to the present invention this object is attained by a food composition including the following substances:

dextrose, Vitamin C, L-glutamine
cysteine, riboflavin, succinic acid, fumaric acid, and
coenzyme Q10,

all substances in physiologically relevant doses.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP2005/001644

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A61P25/32 A23L1/29 A23L1/30 A61K31/7004 A61K31/194
A61K31/375 A61K31/195 A61K31/198 A61K31/525 A61K31/122

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A23L A61P A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ, FSTA, BIOSIS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
A	US 2002/006910 A1 (MIASNIKOV DMITRI ET AL) 17 January 2002 (2002-01-17) paragraphs '0002!, '0005!, '0008! - '0016!, '0019! example 1	1-18
A	WO 03/006073 A (PENAM INVESTMENTS PTY LTD; MCGREGOR, NEIL, ROLAND) 23 January 2003 (2003-01-23) page 1, line 20 - page 2, line 21 page 5, lines 16-25 page 8, lines 10,11 page 8, line 20 - page 9, line 5 page 10, lines 11-28 page 11, lines 7-13	1-18

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[X] Further documents are listed in the continuation of box C

[X] Patent family members are listed in annex

* Special categories of cited documents :

'A' document defining the general state of the art which is not considered to be of particular relevance

'E' earlier document but published on or after the international filing date

'L' document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

'O' document referring to an oral disclosure, use, exhibition or other means

'P' document published prior to the international filing date but later than the priority date claimed

'T' later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

'X' document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

'Y' document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

'&' document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
14 July 2005	01/08/2005

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel (+31-70) 340-2040, Tx 31 651 epo nl, Fax. (+31-70) 340-3016	Couzy, F

Form PCT/ISA/210 (second sheet) (January 2004)

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP2005/001644

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
A	FR 2 748 935 A (CLERGEAUD JEAN) 28 November 1997 (1997-11-28) page 3, lines 7-17 claims 1,2	1-18
A	GB 2 308 810 A (* SOBERING THOUGHTS LIMITED) 9 July 1997 (1997-07-09) pages 2-3,5,6	1-18
A	PATENT ABSTRACTS OF JAPAN vol. 014, no. 334 (C-0742), 18 July 1990 (1990-07-18) & JP 02 124084 A (AJINOMOTO CO INC), 11 May 1990 (1990-05-11) abstract	1-18
A	EP 0 185 117 A (IPEX GETRANKE-HERSTELLUNGS- UND VERTRIEBSGESELLSCHAFT MBH) 25 June 1986 (1986-06-25) page 1, paragraph 1 page 3, paragraph 2	1-18

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2005/001644

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☒ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

see FURTHER INFORMATION sheet PCT/ISA/210

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: -

Present claim 18 relate to a composition defined by reference to desirable properties, namely the desired effects produced within the body after administration.
The claim covers all compositions having these properties whereas the application provides support within the meaning of Article 6 PCT and/or disclosure within the meaning of Article 5 PCT for only a very limited number of such compositions. In the present case, the claims so lack support, and the application so lacks disclosure, that a meaningful search over the whole of the claimed scope is impossible. Independent of the above reasoning, that claim also lack clarity (Article 6 PCT). Indeed, an attempt is made to define the compositions by reference to a result to be achieved. Again, this lack of clarity in the present case is such as to render a meaningful search over the whole of the claimed scope impossible. Consequently, the search has been carried out for those parts of the claims which appear to be clear, supported and disclosed, namely those parts relating to the compositions according to claims 1-17 which, according to p.5 of the description, allow to obtain these desired effects.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/EP2005/001644

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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		CA 2453159 A1	23-01-2003
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